

USSN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

THE CLAIMS

1. (Previously Presented) A method of determining a remaining life of a power source having a voltage in an implantable medical device comprising the steps of:

assessing the voltage of the power source through an actual measurement;

determining, based on the voltage of the power source, capacity information of the power source;

obtaining a time that the power source has been operating through an actual measurement; and

determining the remaining life of the power source based on the capacity information of the power source and the time that the power source has been operating.
2. (Previously Presented) The method of claim 1 wherein the step of assessing the power source voltage utilizes an analog to digital (A/D) converter.
3. (Previously Presented) The method of claim 1 wherein the step of determining capacity information of the power source comprises determining a remaining power source capacity.
4. (Canceled)
5. (Previously Presented) The method of claim 1 wherein the step of determining the remaining life of the power source includes the steps of:

determining a probable usage rate of the power source from the capacity information; and

dividing a determined remaining capacity by the probable usage rate of the power source.

USSN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

6. (Previously Presented) The method of claim 1 wherein the step of determining the remaining life of the power source includes the step of determining the probable usage rate of the power source.
7. (Previously Presented) The method of claim 6 wherein the step of determining the probable usage rate of the power source includes the step of determining the used capacity of the power source.
8. (Previously Presented) The method of claim 7 wherein the step of determining the probable usage rate of the power source includes the step of dividing the determined used capacity of the power source by the length of time that the implantable medical device has been working.
9. (Previously Presented) The method of claim 6 wherein the step of determining the probable usage rate of the power source includes the step of determining the used capacity of the power source since the last time the implantable medical device was reprogrammed.
10. (Previously Presented) The method of claim 9 wherein the step of determining the probable usage rate of the power source includes the step of dividing the determined used capacity of the power source since the last time the implantable neurological tissue stimulator was reprogrammed by the length of time since the implantable medical device was reprogrammed.
11. (Canceled)
12. (Previously Presented) The method of claim 1 wherein the step of determining capacity information of the power source includes the step of correlating, in a "look-up table", the power source voltage assessed in the step of assessing the power source voltage to a predetermined "power source capacity remaining" value.

USSN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

13. (Previously Presented) The method of claim 1 wherein the step of determining capacity information the power source includes the step of correlating, in a "look-up table", the power source voltage assessed in the step of assessing the power source voltage to a predetermined "power source capacity used" value.
14. (Previously Presented) The method of claim 1 wherein the step of determining capacity information of the power source includes the step of determining the power source capacity used and then subtracting this value from the total power source capacity;
whereby, the power source capacity remaining is determined.
15. (Previously Presented) The method of claim 1 wherein the step of determining capacity information of the power source includes the step of determining the power source capacity remaining and then subtracting this value from the total power source capacity;
whereby, the power source capacity used is determined.
16. (Previously Presented) The method of claim 1 wherein the step of determining capacity information of the power source includes the step of calculating, using the voltage of the power source determined in the step of assessing the voltage of the power source, the remaining power source capacity by a formula.
17. (Previously Presented) A method of determining the current status and remaining life of a power source in an implantable medical device comprising the steps of:
assessing the power source voltage of the power source in an implantable medical device;

USPN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

determining, based on the assessed power source voltage, where the power source is in its power source life cycle by calculating the remaining power source capacity by using a formula of the form: Remaining Battery Capacity = a constant + a constant multiplied by the power source voltage determined in the step of assessing the power source voltage of the power source in an implantable medical device; and

taking appropriate action in response to the determination of where the power source is in its power source life cycle.

18. (Original) The method of claim 16 wherein the step of calculating the remaining power source capacity by a formula includes the step of calculating the remaining power source capacity by using a non-linear formula.

19. (Canceled)

20. (Previously Presented) A method of determining the current status and remaining life of a power source in an implantable medical device comprising the steps of:

assessing the power source voltage of the power source in an implantable medical device;

determining, based on the assessed power source voltage, where the power source is in its power source life cycle by calculating the power source capacity by using a formula of the form: power source capacity used = a constant + a constant multiplied by the power source voltage determined in the step of assessing the power source voltage of the power source in an implantable medical device; and

taking appropriate action in response to the determination of where the power source is in its power source life cycle.

21. (Canceled)

USSN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

22. (Previously Presented) The method of claim 1 further comprising the step of informing the user of the status of the power source.
23. (Previously Presented) The method of claim 22 wherein the step of informing the user includes the step of displaying a representation of the percentage of power source capacity used.
24. (Previously Presented) The method of claim 22 wherein the step of informing the user includes the step of displaying a representation of the percentage of power source capacity remaining.
25. (Previously Presented) The method of claim 22 wherein the step of informing the user includes the step of determining whether the remaining power source capacity falls within a predetermined limit.
26. (Original) The method of claim 25 wherein the step of determining whether the remaining power source capacity falls within a predetermined limit further includes the step of alerting the user if the remaining power source capacity falls within a predetermined limit.
27. (Original) The method of claim 26 wherein the step of alerting the user if the remaining power source capacity falls within a predetermined limit further includes the step of alerting the user by triggering an alarm.
28. (Previously Presented) The method of claim 27 wherein the step alerting the user by triggering an alarm includes the step of triggering an alarm chosen from the group consisting of audible or visual warnings.
29. (Canceled)
30. (Previously Presented) A device for determining the status and remaining life of a power source in an implantable neurological tissue stimulator, device comprising:

USSN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

an implantable neurological tissue stimulator, the implantable neurological tissue stimulator having:

a source of power having a voltage;

a voltage determining system for determining the voltage of the source of power through an actual measurement;

a programmer for creating and processing information to be sent to and received from the implantable neurological tissue stimulator, the programmer including a processor and a memory attached thereto;

a system for communicating information between the implantable neurological tissue stimulator and the programmer;

wherein the voltage determining system passes the voltage of the source of power to the system for communication; and

wherein the system for communication passes the voltage of the source of power from the implantable neurological tissue stimulator to the programmer and to the processor, and

wherein the processor determines, based on the voltage of the source of power, capacity information of the power source and determines the remaining life of the power source based on the capacity information of the power source and a time that the power source has been operating obtained through an actual measurement.

31. (Previously Presented) The device of claim 30 wherein the processor determines the capacity information of the power source by correlating the voltage with a remaining capacity value stored in a "look-up" table.
32. (Previously Presented) The device of claim 30 wherein the processor determines the capacity information of the power source by correlating the voltage with a used capacity value stored in a "look-up" table.

USSN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

33. (Previously Presented) The device of claim 30 wherein the processor determines the capacity information of the power source by calculating the remaining capacity of the source of power by using a predetermined formula.
34. (Previously Presented) The device of claim 30 wherein the processor determines the capacity information of the power source by calculating the used capacity of the source of power by using a predetermined formula.
35. (Original) The device of claim 30 wherein the power source is a battery.
36. (Original) The device of claim 30 wherein the power source is a capacitor.
37. (Previously Presented) A method of electrically stimulating nervous tissue in a patient, comprising the steps of:
- implanting in the patient a pulse generator having a power source, and a lead connected to the pulse generator;
- stimulating nervous tissue with electrical pulses generated by the pulse generator and communicated by the lead;
- controlling the pulse generator within preset limits by the patient to adjust stimulation of nervous tissue;
- determining the status and remaining life of the power source as set forth in claim 1.
38. (Previously Presented) A method of electrically stimulating nervous tissue in a patient, comprising the steps of:
- implanting in the patient a pulse generator having a power source, and a lead connected to the pulse generator;
- stimulating nervous tissue with electrical pulses generated by the pulse generator and communicated by the lead;

USSN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

controlling the pulse generator within preset limits by the patient to adjust stimulation of nervous tissue;

determining the status and remaining life of the power source as set forth in claim 23.

39. (Previously Presented) A method of electrically stimulating nervous tissue in a patient, comprising the steps of:

implanting in the patient a pulse generator having a power source, and a lead connected to the pulse generator;

stimulating nervous tissue with electrical pulses generated by the pulse generator and communicated by the lead;

controlling the pulse generator within preset limits by the patient to adjust stimulation of nervous tissue;

determining the status and remaining life of the power source as set forth in claim 27.

40. (Previously Presented) The method of claim 1 wherein the step of determining the remaining life of the power source includes the steps of:

determining a probable usage rate of the power source from the capacity information and the time that the power source has been operating; and

determining the remaining life of the power source as a function of the capacity information and the probable usage rate.

41. (Previously Presented) The method of claim 40 wherein said determining the remaining life of the power source step comprises:

determining a remaining capacity of the power source from the capacity information; and

calculating the remaining life of the power source by dividing the remaining capacity of the power source by the probable usage rate of the power source.

USSN 09/364,967
Group Art Unit: 2857
Docket No. 151P08035US01

42. (Previously Presented) The method of claim 41 wherein said capacity information is a used capacity of the power source.
43. (Previously Presented) The method of claim 42 wherein the remaining capacity of the power source is determined from the used capacity of the power source.
44. (Previously Presented) The method of claim 43 wherein the remaining capacity of the power source is determined by subtracting the used capacity of the power source from a total capacity of the power source.
45. (Previously Presented) The method of claim 41 wherein the probable usage rate is a capacity of the power source used per unit time.
46. (Previously Presented) The method of claim 41 wherein the determining the remaining capacity of the power source is calculated by using a formula of the form: Remaining Battery Capacity = a constant + a constant multiplied by the voltage of the power source determined in the step of assessing the voltage of the power source.
47. (Previously Presented) The method of claim 41 wherein the determining the remaining capacity of the power source is calculated by using a formula of the form: power source capacity used = a constant + a constant multiplied by the power source voltage determined in the step of assessing the voltage of the power source.